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Radio Frequency Drying of Seed Cotton

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Abstract. *Seed cotton samples were dried using a radio frequency dryer. Changes in moisture content, fiber quality, and seed quality were measured. Results are pending as of this submission.*

Keywords. Radio frequency drying, cotton, fiber quality, moisture, cottonseed

Introduction

Radio frequency drying is an alternate method that may be used for drying of seed cotton; thereby replacing the use of fossil fuels at the cotton gin. This study was conducted to determine the effect of radio frequency drying on cottonseed and cotton fiber quality.

Materials and Methods

A lot of spindle-picked upland cotton was cleaned with one stick machine and two cylinder cleaners. The lot was subdivided into samples of 1100 grams each. The moisture content of the seed cotton was determined to be 6.5%, wet basis. One-third of the samples were rewetted by addition of water spray to a moisture content of approximately 10% and another one-third of the samples were rewetted to a moisture content of approximately 12% by the same manner. Samples were stored for 2 weeks to allow time for the moisture to equilibrate. Samples were then ready for drying in the radio frequency dryer.

Radio frequency drying was performed using an RF Systems S.R.L. (Italy) type B10 batch dryer operating at 27.12 MHz. The seed cotton samples were placed on a 45 cm by 30 cm (18 inches by 12 inches) non-conducting mat, then inserted into the dryer between the two working electrodes. The electrodes were spaced 17.8 cm (7.0 inches) apart and current was maintained at 0.7 A. Three replications at each of the three moisture levels (6.5, 10, and 12 %) were dried at each of four drying times (0, 5, 10, and 15 minutes).

As each sample was prepared for drying, two samples of seed cotton were taken for moisture content determination. A third sample was taken and ginned on a breeder gin to determine seed and lint moistures, as well. Sample temperature was measured. The sample size was reduced to 1000 grams for the drying test. After drying, the sample was weighed, sample temperature was measured and two seed cotton moisture samples were taken using the same procedure as before drying. The remaining sample was ginned on a breeder gin. Two cotton seed moisture samples were taken. Seed samples were kept for germination and composition analyses. Lint samples were kept for HVI and AFIS analyses.

Conclusion

Results will be presented at the annual international meeting and will be available from the author by e-mailing him at kevibake@nmsu.edu.

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References